

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—The Professor of Anthropology (Dr. E. B. Tylor) delivered a public lecture on Monday, November 23, at the Museum, on "North American Picture-Writing, with special reference to a Series of Historical Wampum-Belts of the Hurons."

The second meeting of the Junior Scientific Club for this term was held on November 18, and was very largely attended. Prof. Gotch performed an experiment showing the effect of a current induced in a nerve, insulated in air, by a Wimshurst electrical machine. Prof. Ray Lankester exhibited and described (1) a series of casts of the jaws and teeth of *Ornithorhynchus*, and of fossil mammalia from the Stonesfield slate; (2) a specimen of *Triarthrus* presented by Prof. O. C. Marsh; (3) a number of species of *Leptocephali*. In connection with the last, Prof. Lankester gave an account of the development of the eel as determined by Grassi. Lord Berkeley read a paper on "The Necessity of Metaphysics in Science," which was followed by a prolonged discussion.

CAMBRIDGE.—Mr. T. L. Heath, editor of *Diophantus* and *Apollonius*, has been approved for the degree of Doctor of Science.

The Council of the Senate propose to present a memorial to the Lord President of the Privy Council communicating the resolutions of the recent Conference on Secondary Education, and urging the importance of early legislation on the subject.

Mr. J. B. Lightfoot has generously presented to the engineering laboratory a refrigerating machine and ice-making apparatus especially adapted for experimental purposes.

Prof. Ewing, Prof. J. Perry, and Mr. J. B. Peace have been appointed examiners in mechanical science.

Mr. W. M. Fletcher and Mr. E. B. H. Wade have been elected Coutts Trotter students in experimental physics at Trinity College.

A BRILLIANT assembly met in the amphitheatre of the new Sorbonne on Thursday last, the occasion being the inauguration of the newly-constituted University of Paris. From the *Times* report we learn that the magnificent hall was filled with a distinguished company, including the President of the Republic, the Prime Minister and his colleagues and the Presidents of the two Houses, the Academicians, the resplendent Diplomatic Corps, all the public bodies, the entire faculty of the Paris University in their robes, and some 5000 or 6000 students. The bodies hitherto forming part of the University of France, which now constitute the University of Paris, are the faculties of Letters, Sciences, Law, Medicine, and Protestant Theology. Without reckoning the 41 chairs of the Collège de France, which retains an independent position, the University has 116 professors, besides lecturers, laboratory directors, and experimentalists.

THE Report of the U.S. Commissioner of Education for the year ending June 30, 1894, consists of two volumes, each of more than one thousand pages. The mass of information thus brought together refers to schools of all grades and in all countries; but limits of space will only permit us to mention a few of the matters dealt with. The report of the "Committee of ten," appointed by the National Educational Association to inquire into the courses of study and conditions of secondary schools, was summarised in these columns a short time ago (vol. liv. p. 308). Another Committee, composed of fifteen members, was appointed to investigate, in a like manner, the work of elementary schools, and their report is included in one of the volumes before us. The Committee discussed in detail the several branches of study that have found a place in the curriculum of the elementary school, with a view to discover their educational value for developing and training the faculties of the mind. Language is given the first place, the opinion being that, in the form of reading, penmanship, and grammar, it should be prominent in the first eight years of study. Arithmetic is given the second place in importance of all studies, because it or mathematical study furnishes the first scientific key to the existence of bodies and their various motions. Mathematics in its pure form, as arithmetic, algebra, geometry, and the application of the analytical method, as well as mathematics applied to matter and force, or statics and dynamics, furnishes the peculiar study that gives the command of the quantitative aspect of nature. It is held that the study of

arithmetic should begin with the second school year and end with the close of the sixth year, the seventh and eighth years being devoted to algebraical methods. Following arithmetic as the second study in importance among the branches that correlate man to nature is geography. This is, therefore, given the next place. The next study ranked in order of value by the Committee is history, after which come other branches, among which is science. It is held that "Natural science claims a place in the elementary school not so much as a disciplinary study, side by side with grammar, arithmetic, and history, as a training in habits of observation and in the use of the technique by which such sciences are expounded." Other matters of scientific interest dealt with in the report are forestry education in France; geology in the colleges and universities of the United States; rules for the spelling and pronunciation of chemical terms; rise and progress of manual training; American learned and educational societies, and criminology.

THE current number of the *Revue Générale des Sciences* contains a paper by M. Cornu, the President of the Académie des Sciences, on the objects of the instruction in the École Polytechnique, and on the principles which ought to decide the courses of instruction therein. In view of the multitudinous discussions in this country on the general questions of the co-ordination of the teaching in schools of different grades and of the prevention of overlapping, this paper is of exceptional interest. The general conclusions at which M. Cornu arrives are as follows. (We must refer our readers to the *Revue* for the arguments which lead up to them.) The object of the school is to give young men destined for the public services that theoretical knowledge which is necessary to enable them to perform their duties with confidence, and to qualify them to help towards the perfection of these services. What is termed *la Mécanique rationnelle* is the foundation of this polytechnic instruction. Students ought to be competent, at the end of their studies, to solve any problem which they may be called upon to deal with in their future careers of engineers and officers. Considering the limited number of years of study and the impossibility of any great development in the interesting subsidiary branches of science, the instruction in other sciences—such as analysis, physics, astronomy—ought to be arranged in such a manner as to assist in the completion and illustration of this course of mechanics. The list of acquirements demanded on admission ought to form a homogeneous whole, without either adventitious additions or serious omissions, capable of immediate application, and, as far as possible, easy of later completion, either by the courses of this school, or of the places of higher instruction, or even by the efforts of the students individually. The experience of old students and their teachers has shown that those subjects studied during the years preparatory to admission leave the most lasting impression on the minds of the students. The courses of the school leave a profound impression, it is true, but to a less degree than this preparatory work. Finally, since the preparatory instruction to the polytechnic school exercises this decisive influence on the minds of the students, it ought to be directed with a view to giving results which would form an intellectual equipment sufficient to serve during the whole career of the student. These results ought to be established by simple and general methods, and to be presented under a definite form on the same lines as those which will be used later. Not only should all useless refinements be carefully avoided, but even subjects which are not in immediate harmony with the general trend of polytechnic instruction.

SCIENTIFIC SERIALS.

American Journal of Science, November.—Missourite, a new leucite rock from the Highwood Mountains of Montana, by W. H. Weed and L. V. Pirsson. This new rock type forms a stock of granular rock intrusion in cretaceous shales, and in the fragmental volcanic material which overlies them, both being highly altered near the contact with the igneous mass. It is dark grey, coarsely and evenly granular, and on closer inspection presents a mottled appearance. The minerals present are apatite, iron ore, olivine, augite, biotite, leucite, and some zeolitic products. This is the first granular volcanic rock in which leucite has been found.—Viscosity of mixtures of liquids, by C. E. Linebarger. The viscosities found by Ostwald's method are all less than those calculated by the rule of mixtures, except in certain mixtures of benzene and chloro-

form, and of benzene and carbon bisulphide. In the latter the differences are very slight, and these liquids may be said to preserve their viscosities without appreciable change. But when the constituent liquids have very different viscosities, such as benzene and nitro-benzene, the resultant viscosity is lowered considerably.—Volume measurement of an air thermometer bulb, by W. G. Cady. This may be accomplished without filling the bulb with water or mercury, by connecting it with a short graduated tube, changing the volume of the combination by an amount indicated on the graduations, and measuring the increase of pressure.—Residual viscosity and thermal expansion, by H. D. Day. A bar of vulcanised rubber expanded until 50° was reached, and then suddenly contracted. On again heating after some time, it expanded till it reached the highest temperature at which it had been maintained beforehand, and then contracted again. This phenomenon is due to internal strain in its manufactured state, and to a consequent molecular settling which sets in at certain temperatures.—Application of certain organic acids to the estimation of vanadium, by P. E. Browning and R. J. Goodman. Describes the determination of vanadium by means of tartaric, oxalic, or citric acid in the presence of molybdenum and tungsten.—Determination of oxygen in air and in aqueous solutions, by D. A. Kreider. A known volume of air is conducted through a strong solution of hydriodic acid in the presence of nitric oxide; the acid is neutralised by potassium bicarbonate; and the liberated iodine is titrated with standard decinormal arsenic solution, from which the equivalent volume of oxygen is readily calculated.—Amphibian footprints from the Devonian, by O. C. Marsh. A genuine specimen of a footprint from some vertebrate animal, apparently amphibian, has been found in the Upper Devonian of Pleasant, Warren County, Pennsylvania. This is the first evidence of life superior to the fishes found in that formation. The specimen is preserved in the Yale Museum.

Wiedemann's Annalen der Physik und Chemie, No. 11.—Rotations in a constant electric field, by G. Quincke. Rods, plates, spheres, or cylinders of a dielectric substance, suspended in a liquid dielectric between vertical condenser plates, exhibit slow rotations about an axis parallel or at right angles to the lines of force when a constant field of sufficient intensity is maintained between the plates. The author describes a great variety of experiments which exhibit this curious phenomenon. He explains it by the electrostatic deformation of the air film adhering to the bodies and producing a tangential pressure.—Photo-electric residual action of kathode rays, by J. Elster and H. Geitel. Alkaline chlorides exposed to the action of kathode rays assume peculiar colorations, and become photo-electrically sensitive. At the same time their phosphorescence diminishes, and a bluish film resembling an alkali metal is deposited on the walls of the tube. The authors naturally supposed that this consisted of metallic sodium, potassium, cesium, or rubidium due to decomposition of their respective salts by the kathode rays. This would account for the observed photo-electric behaviour. But mercury was incapable of forming an amalgam with the deposit, and this explanation is therefore excluded. That it must be sought in a modification of the salt itself is shown by the fact of the photo-electric property remaining in the open air as long as the colour remains. Similar properties are possessed by colourless fluorspar, by potassium carbonate and glass, and to a slighter extent by calcium and barium chlorides. The authors think that a slight reduction takes place, and that the metal produced forms a solid solution in the remainder of the salt.—Interference refractometer for electric waves, by O. Wiedeburg. Describes an arrangement corresponding to Jamin's refractometer adapted to electric waves. The refractive index of paraffin found by this method is 1.418, and of plate glass 2.63, with a probable error of only 1 per cent.—Helmholtz's absolute electro-dynamometer and its use in determining the E.M.F. of a Clark cell, by K. Kahle. The electro-dynamometer consists of a square metallic band acting upon a coil attached to the arm of a balance, the planes of the band and the coil being perpendicular to each other. The square shape has the advantage that only its corners need support, and the band allows of strong currents and simplifies calculation. The E.M.F. of the H-shaped Clark cell was found to be 1.4488 volts at 0° and 1.4322 at 15° .—The cadmium standard cell, by W. Jaeger and R. Wachsmuth. A Clark cell of the H-shape, in which cadmium amalgam is substituted for the zinc amalgam and cadmium sulphate for zinc sulphate has an E.M.F. of 1.019

volts at 20° . It has an extremely small temperature coefficient (0.004 per cent., instead of 0.1 per cent. as in the Clark cell), and it is not surpassed by the ordinary Clark cell as regards durability and facility of reproduction.—Influence of Röntgen rays upon the steam jet, by P. Richarz. Since X-rays make air temporarily conducting, and therefore probably lead to ionic dissociation, they would also on that account increase the condensation in a steam jet. This is actually the case, as the author showed by exposing a steam jet, screened from direct electrostatic action, to the rays traversing an aluminium window.—Aluminium amalgam, by V. Biernacki. This may easily be obtained by dipping an aluminium wire repeatedly into mercury, while each metal is connected with a pole of a battery. It may be kept for a long time in perfectly dry air, but in moist air it oxidises rapidly, forming a growth of pure alumina which makes an attractive lecture experiment.

THE latest issue of the *Izvestia* of the East Siberian branch of the Russian Geographical Society (vol. xxvi., Nos. 4 and 5, Irkutsk, 1896) contains various matters of interest. It begins by an elaborate paper, by A. A. Kaufmann, on the complex forms of land tenure in Siberia. An immense mass of data relative to this question has lately been accumulated by the surveys and explorations which have been made in Siberia, in order to ascertain the area of land which remains free for the new-coming settlers, and the results of these elaborate researches and surveys were embodied in a series of volumes, published by the Ministry of State domains, under the name of "Materials relative to the economical conditions of the peasants in Siberia." M. Kaufmann now sums up the results of these researches, which are the more important as they show what forms of land tenure have been developed by the immigrants themselves, who had been left absolutely free to occupy immense tracts of waste land, and to work out such forms of land tenure as they themselves found convenient. A very great variety of forms of land tenure has thus come into existence in both West and East Siberia, nearly all hitherto known forms of land tenure being represented on this vast area, with the exception of only one, namely the private, hereditary and individual ownership of the land. This last does not exist, while communal possession is everywhere the rule, and it takes a quite unsuspected variety of forms. The prevailing form is the possession by a group of villages, or by the canton or Volost, which includes from ten to fifteen separate villages, and usually has several thousands of inhabitants, who consider the land of the Volost as their common possession, and allot and re-allot it according to their respective needs. Within the estate of the Volost, again, a great variety of forms of land tenure is found, and very often strangers to the canton are also admitted to the temporary possession of parts of the Volost's estate in exchange for similar rights being granted to the inhabitants of the Volost on the land owned by those strangers. On the whole, M. Kaufmann's essay can be earnestly recommended to the attention of the students of the subject in this country.—Two papers, on the Buryates of Irkutsk, by P. E. Kulakoff, and on the Buryates of Transbaikalia, by M. A. Kroll, are full of interest, as the former contains valuable remarks on the influence of the Shamanist religion, the epidemical insanity which lately prevailed in the Buryate settlements, the influence of contact with the Russians, &c.; while the second has new data upon the tribal organisation, and mentions the interesting fact that the Transbaikalia Buryates do not die out as other natives do, but have doubled their numbers since the beginning of this century.—Three papers, on the Yakutes, deal with the old tribal organisation of the Yakutes, with some graves of the beginning of this century, and with the Yakute tales collected by the late M. Khudyakoff, and lately published at Irkutsk under the name of "Verkhoyanskiy Sbornik."—V. B. Shostakovich contributes a paper on the protective adaptations of the buds in different Siberian trees and bushes (with one plate); and Prof. Katanoff gives an account of the Turkish inscriptions on the Orkhon and the Yenisei.

SOCIETIES AND ACADEMIES.

LONDON.

Chemical Society, November 5.—Mr. A. G. Vernon Harcourt, President, in the chair.—The following papers were read:—The constitution of the so-called nitrogen iodide, by F. D. Chattaway. The most probable formula assignable to